WHAT IS CLAIMED IS:

1. An isolated nucleic acid molecule selected from the group consisting of:

a) a nucleic acid molecule having a nucleotide sequence which is at least 90% identical to the nucleotide sequence of Chlamydomonas intraflagellar transport (IFT) particle protein gene 20, 27, 46, 52, 57, 72, 88, 122, 139, or Che-2, or a complement thereof;

b) a nucleic acid molecule comprising at least 15 nucleotide residues and having a nucleotide sequence identical to at least 15 consecutive nucleotide residues of the nucleotide sequence of Chlamydomonas IFT particle protein gene 20, 27, 46, 52, 57, 72, 88, 122, or 139, or Che-2, or a complement thereof;

c) a nucleic acid molecule which encodes a polypeptide comprising the amino acid sequence of Chlamydomonas IFT particle protein 20, 27, 46, 52, 57, 72, 88, 122, 139, or Che-2; or

d) a nucleic acid molecule which encodes a polypeptide comprising at least 10 amino acids and having an amino acid sequence identical to at least 10 consecutive amino acids of the amino acid sequence of Chlamydomonas IFT particle protein 20, 27, 46, 52, 57, 72, 88, 122, 139, or Che-2.

2. The isolated nucleic acid molecule of claim 1, which is selected from the group consisting of:

a) a nucleic acid having the nucleotide sequence of Chlamydomonas IFT particle protein gene 20, 27, 46, 52, 57, 72, 88, 122, 139, or Che-2, or a complement thereof; and

b) a nucleic acid molecule which encodes a polypeptide having the amino acid sequence of Chlamydomonas IFT particle protein 20, 27, 46, 52, 57, 72, 88, 122, 139, or Che-2.

3. The nucleic acid molecule of claim 1, further comprising nucleic acid sequences encoding a heterologous polypeptide.

4. A vector comprising the nucleic acid molecule of claim 1.

5. A host cell comprising the nucleic acid molecule of claim 1.

6. The host cell of claim 5, wherein the host cell is a non-human mammalian host cell.

7. An isolated polypeptide selected from the group consisting of:

a) a polypeptide comprising at least 10 amino acids and having an amino acid sequence identical to at least 10 consecutive amino acids of the amino acid sequence of Chlamydomonas intraflagellar transport (IFT) particle protein 20, 27, 46, 52, 57, 72, 88, 122, 139, or Che-2;

b) a polypeptide comprising the amino acid sequence of Chlamydomonas IFT particle protein 20, 27, 46, 52, 57, 72, 88, 122, 139, or Che-2, wherein the polypeptide comprises one or more conservative amino acid substitutions that do not inhibit the biological activity of the polypeptide relative to a corresponding native Chlamydomonas IFT particle protein; and

c) a polypeptide which is encoded by a nucleic acid molecule comprising a nucleotide sequence which is at least 90% identical to a nucleic acid consisting of the nucleotide sequence of Chlamydomonas IFT particle protein gene 20, 27, 46, 52, 57, 72, 88, 122, 139, or Che-2, or a complement thereof.

8. The isolated polypeptide of claim 7, comprising the amino acid sequence of Chlamydomonas IFT particle protein 20, 27, 46, 52, 57, 72, 88, 122, 139, or Che-2.

9. The polypeptide of claim 7, wherein the polypeptide further comprises heterologous amino acid residues.

10. An antibody that selectively binds to the polypeptide of claim 7.

11. An antibody that selectively binds to the polypeptide of claim 8.

12. An isolated nucleic acid molecule selected from the group consisting of:

a) a nucleic acid molecule having a nucleotide sequence which is at least 90% identical to the nucleotide sequence of mouse intraflagellar transport (IFT) particle protein gene 57, or a complement thereof;

b) a nucleic acid molecule comprising at least 15 nucleotide residues and having a nucleotide sequence identical to at least 15 consecutive nucleotide residues of the nucleotide sequence of mouse IFT particle protein gene 57, or a complement thereof;

c) a nucleic acid molecule which encodes a polypeptide comprising the amino acid sequence of mouse IFT particle protein 57; or

d) a nucleic acid molecule which encodes a polypeptide comprising at least 10 amino acids and having an amino acid sequence identical to at least 10 consecutive amino acids of the amino acid sequence of mouse IFT particle protein 57.

13. The isolated nucleic acid molecule of claim 12, which is selected from the group consisting of:

a) a nucleic acid having the nucleotide sequence of mouse IFT particle protein gene 57 or a complement thereof; and

b) a nucleic acid molecule which encodes a polypeptide having the amino acid sequence of mouse IFT particle protein 57.

14. An isolated polypeptide selected from the group consisting of:

a) a polypeptide comprising at least 10 amino acids and having an amino acid sequence identical to at least 10 consecutive amino acids of the amino acid sequence of mouse intraflagellar transport (IFT) particle protein 57;

b) a polypeptide comprising the amino acid sequence of mouse IFT particle protein 57, wherein the polypeptide comprises one or more conservative amino acid substitutions that do not inhibit the biological activity of the polypeptide relative to native mouse IFT particle protein 57; and

c) a polypeptide which is encoded by a nucleic acid molecule comprising a nucleotide sequence which is at least 90% identical to a nucleic acid consisting of the nucleotide sequence of mouse IFT particle protein gene 57, or a complement thereof.

15. The isolated polypeptide of claim 14, comprising the amino acid sequence of mouse IFT particle protein 57.

16. A method for identifying a candidate compound that modulates the activity of mouse intraflagellar transport (IFT) particle protein 57, the method comprising:

contacting a test compound to an isolated IFT particle polypeptide of claim 14; and

determining whether the test compound interacts with the polypeptide, wherein interaction indicates that the test compound is a candidate modulator of mouse IFT particle protein 57.

17. A method for identifying a candidate compound that modulates the activity of a human intraflagellar transport (IFT) particle protein, the method comprising:

contacting a test compound to an isolated IFT particle polypeptide; and

determining whether the test compound interacts with the polypeptide, wherein interaction indicates that the test compound is a candidate modulator of a human IFT particle protein.

18. The method of claim 17, wherein the isolated human IFT particle polypeptide is selected from the group consisting of human IFT particle polypeptide 20-1, 20-2, 20-3, 27, 46, 52, 57-1, 57-2, 72, 88, 122, 139-1, 139-2 and Che-2.

19. The method of claim 17, wherein the test compound binds to the isolated IFT particle polypeptide and wherein the modulation is inhibition of activity.

20. The method of claim 17, wherein the test compound binds to the isolated IFT particle polypeptide and wherein the modulation is increasing activity.

21. The method of claim 17, further comprising

contacting the candidate modulator to a culture of cells comprising functional cilia, and

determining whether the candidate modulator inhibits cilia function, wherein inhibition of cilia function indicates the candidate modulator is an IFT particle protein inhibitory agent.

22. The method of claim 17, further comprising

contacting the candidate modulator to a culture of cells comprising non-functional cilia and lacking a specific IFT particle protein, and

determining whether the candidate modulator restores cilia function, wherein restoration of cilia function indicates the candidate modulator is an IFT particle protein restorative agent.

23. A method for identifying a candidate compound that restores the activity of a defective or absent human intraflagellar transport (IFT) particle protein, the method comprising:

obtaining a mixture of isolated IFT particle polypeptides that comprises (i) all but one of the IFT particle polypeptides required to form the IFT particle, and (ii) a medium that enables the IFT particle polypeptides to form the IFT particle when all normal IFT particle polypeptides that constitue that IFT particle are present;

contacting a test compound to the mixture; and

determining whether the test compound enables the IFT particle to be formed, wherein IFT particle formation indicates the test compound is a candidate compound that restores the activity of a defective or absent human IFT particle protein.

24. The method of claim 23, further comprising

contacting the candidate compound to a culture of cells comprising non-functional cilia and lacking a specific IFT particle protein, and

determining whether the candidate compound restores cilia function, wherein restoration of cilia function indicates the candidate compound is an IFT particle protein restorative agent.

25. The method of claim 23, wherein the human IFT particle polypeptide is selected from the group consisting of human IFT particle polypeptides 20-1, 20-2, 20-3, 27, 46, 52, 57-1, 57-2, 72, 88, 122, 139-1, 139-2 and Che-2.

26. A method of diagnosing a disorder in a tissue in a subject caused by a defective or absent human intraflagellar transport (IFT) particle protein, the method comprising

obtaining a sample of cells from the tissue;

disrupting the cells;

contacting the disrupted cell sample with an antibody that specifically binds to a normal human IFT particle protein; and

detecting binding of the antibody to any IFT particle protein in the sample, wherein absence of binding indicates that the tissue has a disorder caused by a defective or absent IFT particle protein.

27. The method of claim 26, wherein the disorder is kidney disease, retinal disorder, thyroid disorder, chondrocyte disease, olfactory disease, azoospermia, or primary ciliary dyskinesia.

28. A method of treating a disorder in a subject caused by a defective or absent intraflagellar transport (IFT) protein, the method comprising administering to the subject a human IFT particle polypeptide in an amount effective to restore the function of the defective or absent IFT particle protein.

29. The method of claim 28, wherein administering the human IFT particle polypeptide comprises administering a nucleic acid that encodes a human IFT particle polyptide.

30. The method of claim 28, wherein the human IFT particle polypeptide is selected from the group consisting of human IFT particle polypeptides 20-1, 20-2, 20-3, 27, 46, 52, 57-1, 57-2, 72, 88, 122, 139-1, 139-2 and Che-2.

31. A method of treating an infection in a subject caused by a pathogen that comprises a intraflagellar transport (IFT) particle protein, the method comprising administering to the subject an effective amount of an agent that inhibits the function of the IFT particle protein.

32. The method of claim 31, wherein the agent is an antibody that binds specifically to the IFT particle protein.

33. The method of claim 31, wherein the subject is a mammal.

34. The method of claim 31, wherein the subject is a human.

35. The method of claim 31, wherein the subject is a plant.

36. The method of claim 31, wherein the pathogen is a nematode, insect, protozoa bacteria.